A Decade of Experience with the Ovine Model of Myelomeningocele: Risk Factors for Fetal Loss.

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Public Summary:
The ovine model is the gold standard large animal model for studying in utero treatment of myelomeningocele (MMC); however, it has a high rate of fetal loss. Given our experience with the ovine model over the past decade, we sought to evaluate the risk factors for fetal loss. We hypothesized that lower ambient temperatures at parturition and Cesarean delivery were associated with lower rates of fetal loss.

Scientific Abstract:
INTRODUCTION: The ovine model is the gold standard large animal model of myelomeningocele (MMC); however, it has a high rate of fetal loss. We reviewed our experience with the model to determine risk factors for fetal loss. METHODS: We performed a retrospective review from 2009 to 2018 to identify operative factors associated with fetal loss (early fetal demise, abortion, or stillbirth). Operative risk factors included gestational age at operation, operative time, reduction of multiple gestations, amount of replaced amniotic fluid, ambient temperature, and method of delivery. RESULTS: MMC defects were created in 232 lambs with an overall survival rate of 43%. Of the 128 fetuses that died, 53 (42%) had demise prior to repair, 61 (48%) aborted, and 14 (11%) were stillborn. Selective reduction of multiple gestations in the same uterine horn was associated with increased fetal demise (OR 3.03 [95% CI 1.29-7.05], p = 0.01). Later gestational age at MMC repair and Cesarean delivery were associated with decreased abortion/stillbirth (OR 0.90 [95% CI 0.83-0.90], p = 0.03, and OR 0.37 [95% CI 0.16-0.31], p = 0.02), respectively. CONCLUSION: Avoiding selective reduction, repairing MMC later in gestation, and performing Cesarean delivery decreases the rate of fetal loss in the ovine MMC model.